

Remarks

This paper is responsive to the Office Action mailed July 9, 2009. In the present Amendment, claims 1, 5, and 17 have been amended, and claim 4 has been canceled. Applicants note that support for the amendment can be found throughout the specification, for example, on page 14, lines 19-23, page 15, lines 1-4, and page 33, lines 1-6, and thus, no new matter has been added. Thus, upon entry of this Amendment, claims 1, 2, 5, 6, 8-10, 12, and 14-18 will be pending, of which claim 1 is independent.

Interview Summary

Applicants thank Examiner Minchul Yang for the telephonic interview on September 29, 2009, and the courtesies extended to Applicants' representatives. During the interview Applicants' representatives, Stephen Roylance and Adaku Nwachukwu, discussed possible amendments to claims 1 and 17.

During the interview, Applicants' representatives proposed amending claim 1 to recite parameters of the transfer layer thickness and the pitch dimensions, and indicated where the support was in the specification. The proposed values were the transfer layer thickness of 1 to 2 μ m and the mold pitch range of 1 to 3 μ m. Although the Examiner stated that the proposed claim amendments may overcome the rejection based on anticipation, he did not commit that the amendment was nonobvious subject matter. The Examiner stated that that he would review the amendments when the response was filed. The Examiner also indicated that incorporating the elements of claim 4 into claim 1 would distinguish the claimed invention from the prior art.

Applicants also thank the Examiner for the Interview Summary mailed October 6, 2009. Applicants note that the Interview Summary accurately summarizes the interview.

Information Disclosure Statement

Applicants note with appreciation that the Office has acknowledged receipt of the Information Disclosure Statement filed on February 5, 2009, and returned electronically signed copy of the Form PTO-1449 submitted therein.

Claim Rejections Under 35 U.S.C. § 103

Claims 1, 2, 4-6, 10, and 14-18

Claims 1, 2, 4-6, 10, and 14-18 are rejected as allegedly unpatentable under 35 U.S.C. § 103, over Okazaki (U.S. Patent 6,495,862), in view of Wierer (U.S. Pub. No. 2005/0082545) and Weller (U.S. Pub. No. 2002/0132083). Applicants respectfully traverse the rejection.

Initially, Applicants note that claim 1 has been amended to recite parameters of the transfer layer thickness and the pitch dimension. Additionally, claim 1 has been amended to incorporate the elements of claim 4, as suggested by the Examiner during the interview conducted on September 29, 2009. Claim 4 has been canceled.

In response, Applicants submit that Okazaki, Wierer, and Weller, alone or in combination, fail to teach or suggest all the elements of claimed invention. In particular, none of the cited documents teaches or suggests, at least, “[a] production method for producing a light-emitting device in which a light-emitting layer at least including an n-type semiconductor layer and a p-type semiconductor layer is layered on a transparent crystal substrate, comprising: applying a silicon organic solution to at least a part of the transparent crystal substrate or the light-emitting layer to form a transfer layer on at least a part of the transparent crystal substrate or the light-emitting layer wherein said transfer layer is 1 to 2μm; softening or setting said transfer layer upon supplying an energy thereto; pressing a mold formed with a minute

unevenness structure against the transfer layer to transfer the minute unevenness structure to an outer surface of the transfer layer under a pressure of 5MPa or higher and 150MPa or lower wherein a pitch is 1 to 3 μ m, wherein the mold has an upper flat portion located near a bottom of the minute unevenness structure to be transferred and a lower flat portion located at a position about a thickness of an upper semiconductor layer of the light-emitting layer, the upper flat portion and a lower flat portion is transferred together with the minute unevenness structure to the transfer layer; and forming electrode-forming portions by etching the upper and lower semiconductor layers of the light-emitting layer when dry etching is carried out using the transfer layer as a resist mask; and dry etching the transfer layer with a chlorine gas using the transfer layer as a resist mask to form a minute unevenness structure for preventing multiple reflection in the transparent crystal substrate or the light-emitting layer.”

Applicants note that when determining obviousness, all limitations of a claim must be considered. In this case, every element of claim 1 must be considered when determining the patentability of claim 1.

In addition, Applicants submit that the parameters recited in claim 1 require non-routine forming steps. In particular, Applicants note that with respect to the transfer layer thickness parameter, the Declaration of record, filed with the response to the Office Action filed March 11, 2009, indicates that “in order to experimentally confirm the relation between the pressure to be applied to the mold and the formation of the minute unevenness structure, *it was necessary to form the transfer layer to a thickness in a range of 1.5 μ m to 2.0 μ m.* We found a way to form the transfer layer by using the silicon organic solvent to the required thickness in the range of 1.5 μ m to 2.0 μ m.” (Declaration, page 2, lines 1-3. Emphasis added). Therefore, Applicants note that the feature of the present invention, where the lower limit value of 5MPa and the upper limit

value of 150MPa for a desirable pressure to be formed on a semiconductor, relates to the recited transfer layer thickness.

The Declaration also indicates that the lower limit value (5 MPa) could not have been specified without determining the process of forming the transfer layer by using the silicon organic solvent to the required thickness for confirming the effect of the pressure applied to the mold. (Declaration, page 3, lines 4-7).

Further, Applicants note that as established by the Declaration, in the method of fabricating a mold by wet etching which takes advantage of the crystal orientation of silicon (Si), the resulting mold would have a thickness of around 2.1 μ m for the pitch of 3.0 μ m. (Declaration, page 2, lines 7-9). Therefore, in this example, the thickness of the transfer layer needed to be 1.5 μ m or thicker.

Applicants also note that with regard to the method for fabricating a mold by wet etching, the thickness of the mold pitch and the thickness of the transfer layer are proportional to each other. For example, when the thickness of the transfer layer is 1.5 μ m, the pitch is 3.0 μ m. Similarly, when the pitch is 4.0 μ m, the transfer layer thickness is 2.0 μ m. Therefore, Applicants submit that in order to determine the parameters recited in the claims, non-routine steps were required.

Applicants respectfully submit that for the reasons stated above, Okazaki, in view of Wierer and Weller do not render obvious claims 1, 2, 4-6, 10, and 14-18.

Claims 8-9 and 12

Claims 8-9 and 12 are rejected as allegedly unpatentable under 35 U.S.C. § 103, over Okazaki, in view of Wierer and Weller in further view of Holman (U.S. Pub. No. 2004/0080938). The rejection contends that Okazaki, Wierer and Weller, teach many of the

elements of claims 8, 9 and 12, and relies on Holman to remedy the deficiencies of the other cited documents. Applicants respectfully traverse the rejection.

Applicants submit that the arguments presented above with respect to the rejections under 35 U.S.C. § 103 over Okazaki in view of Wierer and Weller, are also fully applicable with respect to this present rejection.

In addition, Applicants submit that Holman, alone or in combination with Okazaki, Wierer, and Weller, fails to teach or suggest, at least, “[a] production method for producing a light-emitting device in which a light-emitting layer at least including an n-type semiconductor layer and a p-type semiconductor layer is layered on a transparent crystal substrate, comprising: applying a silicon organic solution to at least a part of the transparent crystal substrate or the light-emitting layer to form a transfer layer on at least a part of the transparent crystal substrate or the light-emitting layer wherein said transfer layer is 1 to 2 μ m; softening or setting said transfer layer upon supplying an energy thereto; pressing a mold formed with a minute unevenness structure against the transfer layer to transfer the minute unevenness structure to an outer surface of the transfer layer under a pressure of 5MPa or higher and 150MPa or lower wherein a pitch is 1 to 3 μ m, wherein the mold has an upper flat portion located near a bottom of the minute unevenness structure to be transferred and a lower flat portion located at a position about a thickness of an upper semiconductor layer of the light-emitting layer, the upper flat portion and a lower flat portion is transferred together with the minute unevenness structure to the transfer layer; and forming electrode-forming portions by etching the upper and lower semiconductor layers of the light-emitting layer when dry etching is carried out using the transfer layer as a resist mask; and dry etching the transfer layer with a chlorine gas using the transfer

layer as a resist mask to form a minute unevenness structure for preventing multiple reflection in the transparent crystal substrate or the light-emitting layer.”

Furthermore, Applicants note that Holman fails to remedy the deficiencies of Okazaki, Wierer, and Weller.

Applicants respectfully submit that for the reasons stated above, Okazaki, in view of Wierer and Weller in further view of Holman do not render obvious claims 8, 9 and 12.

In view of the foregoing, Applicants respectfully request withdrawal of the rejections of record.

CONCLUSION

For at least the foregoing reasons, it is respectfully submitted that all pending claims are patentably distinct over the documents employed in the rejection of record. Applicants request reconsideration and withdrawal of the rejections of record. Allowance of the application with an early mailing date of the Notices of Allowance and Allowability is therefore respectfully requested.

If there should be any questions, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully Submitted,
Hiroshi FUKSHIMA et al.


Bruce H. Bernstein
Reg. No. 29,027

Stephen M. Roylance
Reg. No. 31,296

October 9, 2009
GREENBLUM & BERNSTEIN, P.L.C.
1950 Roland Clarke Place
Reston, VA 20191
(703) 716-1191